3. FUNCTIONAL & TECHNICAL REQUIREMENTS

3.1. General

This Section represents the Companies' Functional and Technical Requirements. Provider must state the ability of its Product to meet the expressed requirements in this Section and explain its response in full detail. Where more than one Product is being proposed, Provider shall respond individually for each Product and must not mix responses together. Provider may also wish to offer an alternative Proposal. Any alternative Proposal must be in addition to the requested information and clearly identified as a separate and alternative Proposal. Provider shall provide any and all information that could reasonably be considered necessary in evaluating its product.

MCImetro's solution meets the requirements specified in each paragraph of the RFP. The response that follows each numbered paragraph contains a detailed description of how the proposed solution fulfills the requirements. It also discusses any proposed alternatives.

3.2. Provider's Response To This Section

The Companies expect clear, concise and relevant responses to each paragraph in this Section 3. Provider must respond to each paragraph with a detailed response regarding how its Proposal will meet the needs specified. If Provider responds in a manner that fails to address a given paragraph, Provider's response will be deemed non-compliant. Provider's Proposal must utilize an identical numbering scheme to that used by the Companies in this Section. The format of Provider's response must show the Companies' paragraph with Provider's response immediately following such paragraph.

Our response to each of the following paragraphs provides a concise and clear description of MCImetro's proposed solution. Our format uses the RFP numbering scheme, with the RFP paragraph reproduced in bold-face type, followed by MCI's responses in roman (non-bold) type. Figures follow the standard format of using a single element to represent STP pairs, SCP pairs, SS7 signaling links, and other redundant components.

3.3. Introduction

[No RFP Paragraph provided]

We recognize that RFP sections 3.3 through 3.3.4. serve primarily to provide definitions and guidelines for the Provider's response to the entirety of Section 3. To maintain consistency, however, we have included responses to these numbered paragraphs.

In establishing MCImetro, MCI made a strong financial and managerial commitment to providing local service in markets throughout the country. We are investing in LNP as an

extension of this commitment to an open local-service marketplace. We want to make LNP happen quickly and in a way that meets the needs of all parties, but we also want to prevent future delays or roadblocks.

In developing our early LNP model, we evaluated different technologies and potential solutions. Our proposal solution best satisfied such criteria as technical feasibility, time to market, development and implementation cost, impact to existing infrastructures, and service and feature interaction and interworking.

The fact that we began developing an LNP model in November 1994 and successfully demonstrated a working prototype in April 1995 attests to the technical feasibility of our solution, as well as to our ability to develop an LNP capability at reasonable cost. As described in sections 3.6., 3.7., 3.8., and 3.12. (including their subsections), our solution minimally affects existing infrastructures. Paragraph 3.12 shows also that our LNP solution works with existing services and features in as friendly a way as possible with current standards.

3.3.1. As part of the Local Number Portability (LNP) technical trial RFP, this technical description provides some assumptions and trial requirements for the Provider. This section is preliminary and will be subject to change as additional trial architectural requirements are understood. The Provider is encouraged to respond to this section with reasonably and efficiently designed networking alternatives as deemed appropriate. The Provider is also encouraged to provide additional proposal/solution details to facilitate the timely implementation of this trial.

We encourage all interested parties to participate in pre-and post-trial activities. Our approach is open, and we will freely share information that will help us all adapt to additional trial architectural requirements..

3.3.2. This section contains information and guidelines pertaining to the trial scope, environment baseline, a proposed trial architecture (which the Provider may adopt or replace with the Provider's alternative) and networking requirements, example trial call scenarios, and trial exit steps.

Our solution addresses all aspects of the trial architecture, networking requirements, trial call scenarios, and trial exit steps. In addition to the specified proposal elements, we have prepared an APPENDIX D, which presents required management steps and a detailed schedule.

3.3.3. Three kinds of number portability are discussed in forums such as the Industry Numbering Committee (INC): service provider portability (defined as the capability for a customer to change local service providers (LSPs) while retaining the same telephone number), geographic portability (defined as the ability to change locations without changing numbers), and service portability (defined as the ability

to change services without changing numbers). LNP as discussed in this document refers to service provider portability.

As requested by the RFP our proposed solution focuses on Service Provider Portability. Still, all three types of portability defined by the Industry Numbering Committee (INC) are important to us, and our evaluations consider ease of future migration to or addition of other types of portability.

3.3.4. The Provider is defined as an established company or companies which will provide the system platforms necessary to integrate LNP with existing network elements. Participating carriers are defined as those network services providers that commit to participate in this trial. The trial end users are defined as those whose local service and hence telephone numbers will be ported from one local service provider's network to another local services provider's network.[3] [RFP Footnote 3 - Note that call processing for all customers whose numbers are in a NPA-NXX containing ported numbers will be affected by the trial, not just those customers whose service actually moves from one LSP to another.]

MCImetro proposes to become the Provider for the LNP trial system platform. In preparing this proposal, MCImetro has had the active cooperation and support of the following companies:

- Northern Telecom, Inc. (NORTEL)
- Siemens Stromberg-Carlson
- DSC Communications
- Tandem Computer

These same companies will also support us should we be awarded the LNP trial.

3.4. Purpose and Scope of Trial

[No RFP Paragraph provided]

We believe that the RFP's February 1996 deadline for initiating the test of the technical feasibility of a network database-driven LNP-service architecture requires a trial solution that employs technology and capabilities currently deployed. Our solution meets this critical condition.

We considered other approaches but they would have required more modification to the existing infrastructure; either changes in the standards, which could take a significant amount of time to complete, or extensive switching and operational support system modifications, which could have a significant cost burden and time requirement. Not

only does our solution minimize these impacts, but most of the technical software development has already been completed.

MCImetro's approach not only meets the current needs but also is sufficiently flexible to accommodate other technologies that may be introduced in the future.

3.4.1. Network Architecture

The primary purpose of the LNP trial is to test the technical feasibility of a network database-driven LNP service architecture and identify technical constraints of the trial architecture. This technical trial will focus on the capability to allow end users to change from one local service provider's network to another without changing their directory number (DN). It is assumed that the trialed DNs will be ported to the new local service provider's network.

We have already conducted the initial testing and proven the technical feasibility in a laboratory environment, and thus, are well prepared to continue these activities in a field trial environment. The trial will focus on the rigorous testing required to identify the technical constraints. Our tests will also support engineering analyses and, when appropriate, use simulation tools to assess impacts and technical constraints in a large-scale environment. Our long-term goal is to help LNP become commercially available to telephone subscribers.

3.4.2. Trial Timeline

This trial is expected to take place in New York State, with designated trial offices located in Manhattan and Rochester, New York. The target time frame, including the phases specified in Section 3.5.2, for this technical trial is expected to begin implementation on or about February 1, 1996, and will last for approximately six months. The Provider is encouraged to provide efficient, network database-driven solutions for the LNP trial in the specified time frame. If the Provider-proposed systems and solutions are beyond the requested time frame, Provider shall respond with a total implementation timeline accordingly.

Paragraphs 3.6, 3.7, and 3.8 describe our efficient, network database-driven solution for the trial. We are committed to on-time performance of all pre-trial, trial, and post-trial activities, and to supporting and promoting early, broad-scale, commercial LNP implementation. In line with this commitment we have:

- developed a preliminary plan of action and milestones to be refined and coordinated with participating Companies and other interested parties at a pre-trial inaugural meeting that we propose to host in New York in July 1995. APPENDIX D includes details of our action checklist.

- designed our project plan to address key issues and conduct needed training early. This should ensure everyone's readiness to begin the trial on February 1, 1996, and to complete all three phases within six months of trial start-up.

- developed and demonstrated an efficient network database driven LNP model as described in paragraphs 3.6 through 3.8.7.4. This model, which features both IN and AIN 0.1 interfaces, is ready for easy carrier and switch-vendor access.

We propose a pre-trial inaugural meeting in July 1995 to help ensure a fully coordinated ramp-up of pre-trial activities. This meeting will introduce our architecture and approach to all participating Companies and other interested parties. In conjunction with this meeting, we intend to hold working sessions on various subjects, especially those with potential impact on time-lines. For instance, we will use one of the working sessions to introduce a number of the draft process documents described in Paragraphs 3.5.3. and 3.7.1., and will seek information and comments on each.

In another work session, we will use the initial action list and schedule, APPENDIX D, of this proposal, as a basis for coordinating and refining our plan of action and milestones throughout the pre-trial, trial, and post-trial periods. This action list will be coordinated and updated monthly thereafter. A well coordinated and closely monitored management approach is absolutely necessary to meeting all trial time-line requirements.

MCImetro will host monthly meetings to keep everyone abreast of plan and schedule changes, and to monitor progress and modify plans and schedules as needed to be ready to start the trial on February 1, 1996. We are prepared to modify our procedures as needed to assure responsiveness of all interested parties, and will address all concerns that are brought to our attention. We are prepared to staff Manhattan and Rochester offices with personnel responsible for planning, installing, and testing equipment needed to support the trial, and for coordinating these activities with, New York Telephone, Rochester Telephone Corporation, and other carriers.

APPENDIX D contains a detailed plan of actions ranging from recent and current activities (under "Pre-award Activities"), through pre-trial, trial, and post-trial activities.

3.5. Trial Environment Baseline

[No RFP Paragraph provided]

We comply with all RFP trial environment baseline requirements. The following paragraphs provide our detailed responses to RFP paragraphs 3.5.1. through 3.5.6.

3.5.1. A number of central offices in Manhattan and Rochester, New York, have been selected for an initial trial base.[4] [RFP Footnote 4 -The New York Telephone NXXs (all NPA 212) are 318 and 935 in a DMS 100 on E. 56th St. and 210 and 922 in

a 5ESS™ switch on E. 37th St. The Rochester NXXs (NPA 716) are 262, 325, and 987 in a 5ESS™ switch on Stone St.] Some numbers currently assigned to these New York Telephone or Rochester Telephone offices will be ported to other local service providers' networks, and eventually numbers assigned to other local service providers may be ported to these New York Telephone or Rochester Telephone offices. Networks of other providers (e.g., interexchange carriers, cellular services providers) that choose to participate in the trial will also be affected by this LNP capability. As such, the Provider's proposed solution shall take into account the diverse capabilities of these various networks. It is assumed that the integrated trial environment should support a traffic mixture from LNP capable switches and non-LNP capable switches belonging to participating carriers and switches of non-participating carriers.

Our LNP solution is ideally suited to this trial environment because its robust, open architecture is designed for the integration of both LNP-capable and non-LNP capable switches. Because it uses both existing Intelligent Network (IN) and Advanced Intelligent Network Release 0.1 (AIN 0.1) protocols and triggers, it allows participating carriers a choice of two implementation methods. Both the IN and AIN 0.1 methods have been successfully demonstrated in prototype testing using a laboratory environment using a single Service Control Point (SCP). Throughout this proposal, the term "switch" is used to refer to either an IN switch or an AIN Service Signaling Point (SSP).

Calls from non-LNP-capable switches to ported numbers can easily be accommodated by either MF or SS7 connectivity to an LNP-capable switch in the trial network. Inter-connection via MF trunks between LNP- capable switches offers a significant advantage because it allows portability to be deployed in areas with non-SS7-capable switches.

Because we believe it is essential that any LNP solution minimize change to existing infrastructure and processes, our model does not require significant upgrades or modifications to the existing US public switching network. Paragraphs 3.5.3, 3.5.5, 3.6, and 3.7 discuss in detail how our model meets this requirement and works with the existing infrastructure.

Along with our proven technical solution, MCImetro also brings a wealth of knowledge and experience in the area of local number portability. We welcome the opportunity to share these resources with the participating Companies during the trial. Our goal is to effectively demonstrate that LNP can become a commercial reality in the very near future.

3.5.2. In the initial phase of the trial, ported numbers will be from dedicated, unused NXXs to prevent potential disruption of existing services during testing. Following successful first phase testing, the trial will be expanded to a limited number of NXXs in general use. In this second phase, end users whose numbers are moved from one local service provider to another will be in administrative offices of trial participants. In a third phase, customers presently served by interim number

portability arrangements, i.e., remote call forwarding, will be converted to the LNP trial capability.

The MCImetro Local Number Portability model has the flexibility to initially accommodate a small number of customers in a minimal set of NXXs, and then be expanded to a larger number of customers in numerous NXXs.

We understand the purpose and concur with the stated phased implementation requirements of the trial. Because Phase I of the trial uses previously unused NXXs, there will be virtually no possibility of service interruption. Phase I will serve as a proof of concept to the trial participants and also will present an opportunity to identify any areas that require special attention during the ensuing phases.

Phase II will serve as a preparation for Phase III by ensuring and validating procedures needed to coordinate the portability of subscriber numbers.

Phase III will validate the subscriber transparency of our model. In fact, ported subscribers converted from remote call forwarding to our LNP model will experience quality-of-service improvements in terms of post-dial delay. Phase III will be a major stepping stone toward broad-scale LNP implementation planning.

We will work closely with each trial participant to establish detailed procedures to ensure successful completion of each phase with no adverse impact to existing customers' service. Prior to incorporation into the test, we will verify each procedure using our working prototypes.

3.5.3. It is assumed that the trunking topology amongst the switching offices in New York (trial participating or non participating) should remain the same for this trial, unless otherwise described.

Our solution does not require any changes to the existing network topology beyond the addition of the LNP SCP and its connecting SS7 links. It is important to note that any existing MF trunk circuits (backup or otherwise) between any two participating switches will not be affected by the trial, do not need to be removed, and in fact can be actively used in the trial to transport calls to, from, and between ported customers.

All participating Companies providing the LNP-capable switches will be required to establish SS7 connectivity between their switches and the LNP SCP. This connectivity may be provided via an existing MCI STP pair using existing links unless other connections are required. As the trial manager, MCImetro will work with participating Companies to implement any necessary alternative arrangements. The new SS7 links required for the SCP will be connected between the MCI STP pair and the SCP in a standard redundant-pair configuration consisting of four "A" links, two to each STP in the pair.

Without knowing the specific details of the existing SS7 network associated with the New York Telephone and Rochester Telephone switches identified in Paragraph 3.5.1, this proposal makes the assumptions reflected in Figure 3.5.3-1. These assumptions were made to help describe a proposed trial topology, not to reflect known conditions or to imply that changes are required in the existing network. Because our assumptions may not be correct, we are prepared to work with each participating carrier to implement the trial with no or minimal changes to the network topology.

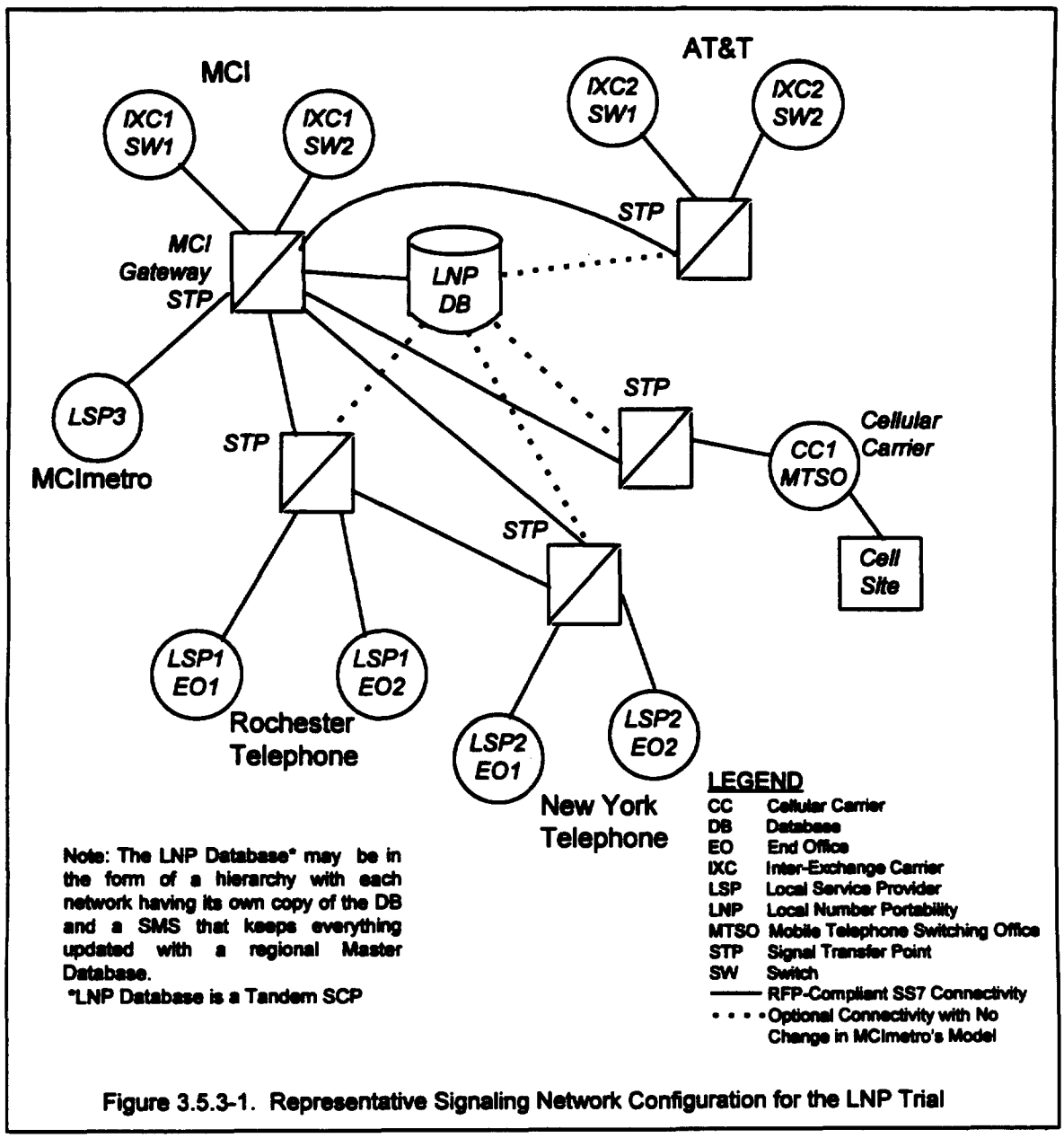


Figure 3.5.3-1. Representative Signaling Network Configuration for the LNP Trial

For purposes of this proposal, we made the following assumptions:

- Each of the switches identified in RFP Paragraph 3.5.1. is connected to at least one SS7-capable access tandem switch that provides all normally required Equal Access services, including 800 database queries.

- This access tandem switch has existing connections with all Interexchange Carriers (IXCs) that may opt to participate in the trial. (TR-TSY-394 SS7 connectivity is not required between this access tandem and participating IXC switches; in-band MF trunks may be used.)

- If intra-LATA tandem functionality is not provided on the access tandem identified above, one or more other local tandems are available to provide direct connections to each of the switches identified in RFP Paragraph 3.5.1.

- The local (and access, if different) tandem switch has connections to all participating switches owned by alternative local service or cellular service providers participating in the trial.

- Pending verification from New York Telephone and Rochester Telephone, the identified switches have interexchange points of presence (IXC POPs) for at least one participating IXC carrier.

- Because a normal "community of interest" exists in the trial areas, there is value in having one or more direct trunk groups link the participating Local Service Provider switches. These links will be used to test direct routing functionality between participating Companies' switches. If such a trunk group does not exist, the trial manager may recommend that one be provided for use in testing specific call scenarios.

Immediately following project award, we will proceed to verify the above assumptions, and, if necessary, to adjust our program.

3.5.4. For the trial, number administration will continue to be handled by New York Telephone and Rochester Telephone, though it is recognized that a long-term LNP architecture will require industry agreement on number resources assignment and administration.

MCImetro agrees that, for this trial, number administration will continue to be handled by New York Telephone and Rochester Telephone. We recognize that a third party Service Management System (SMS) ultimately may be required to control number administration and database synchronization in a commercially deployed LNP network.

Our LNP solution requires that a three-digit code called the Carrier Portability Code (CPC) be assigned to each participating carrier for each NPA involved in the trial. Each

assigned CPC will be different from any NPA being used in the local area. We will coordinate CPC assignment with all interexchange carriers and Local Service Providers in the area, then will enter them in the LNP database and provide them to the participants for entry into their switch-routing tables.

We have already demonstrated our Local Number Portability model (using switches and STPs from established vendors) to various organizations. In doing this, we have gained some experience with the process actually required to move a subscriber. The prototype service management tool that we are currently using updates the following databases in the order shown:

1. Update the new service provider's switch with the DN of the ported subscriber.

2. Update the LNP database with the new service provider's CPC for the ported subscriber's DN.

3. Update the STP Global Title Translations (GTT) database with the correct point code to enable Customized Local Area Signaling Services (CLASS) functionality for the subscriber. This step will allow the CLASS features used by the ported subscriber to function normally.

4. Remove the DN of the ported subscriber from the original service provider's switch.

Even though these database updates may be accomplished sequentially, there will inevitably be some time delay between updates. The sequence we propose for updating will cause the least amount of service interruption for the ported subscriber, but participating carriers must agree on and conform to a clearly defined set of procedures and timetables.

We plan to discuss this process with the participating Companies at the pre-trial meetings to ensure that these updating steps, as well as the movement of the physical connection, are mutually agreeable, coordinated, and formalized into a procedural document. Appendix D contains a timetable for these discussions.

3.5.5. Participating carriers may incur incremental changes to their operations, processes, and procedures within their respective networks for the trial. As in the current North American network environment, process cooperation and linkage between LECs and IXCs will continue to exist for this trial.

We have made every effort to minimize changes to participating carriers' operations, processes, and procedures within the trial network. Should any modification be required, we will clearly communicate the needed change and the reason for it to all affected participants and we will work with carriers and their vendors to minimize the impact on

them and their customers. Paragraph 3.7.1. details some of the procedures that we will develop to support this activity during the trial.

3.5.6. Capacity impacts on switching, trunking, signaling, and network databases of the trial base will be evaluated.

The feasibility of LNP cannot be determined without an accurate measurement of its impact on network capacity and performance. Accordingly, we are committed to gathering this information during the LNP trial. We will work with other trial participants during the pre-trial stage to identify appropriate capacity measurements and establish methods for recording those measurements during the trial. In this process, we will include the knowledge gained from our LNP laboratory-testing experiences. We are currently performing capacity and performance measurements in our laboratory, and will expand the scope of these activities.

Capacity measurements, including those made during the trial are affected by the topology of the trial network. We expect to change capacity measurements as the trial progresses through its three phases and the number of ported subscribers increases.

3.6. Proposed Trial Architecture

[No RFP Paragraph Provided]

Our LNP solution allows Local Number Portability to be deployed in pockets, or as portability "islands", without requiring extensive changes to the existing network architecture or to the switch software. By utilizing the existing TCAP 800 Intelligent Network (IN) and Advanced Intelligent Network Release 0.1 (AIN 0.1) protocols and triggers, our model facilitates a smooth introduction into local serving areas and precludes many of the problems faced by other LNP concepts.

Specifically, our model offers the following advantages and benefits:

- Proven in prototype testing across four switch types (DMS-100, DMS-250, DEX 600 EWSD switch)
- Offers complete transparency to all subscribers
- Uses existing IN/AIN 0.1 protocols
- Supports IN architecture with minimal software changes
- Takes advantage of inherent central office routing capabilities
- Supports both Multi-Frequency (MF) and Signaling System 7 (SS7) trunks
- Transparently supports widely deployed subscriber features (e.g., Call Forwarding, Calling Number Delivery, Customer Originated Trace, etc.)
- Supports Non-LNP capable offices

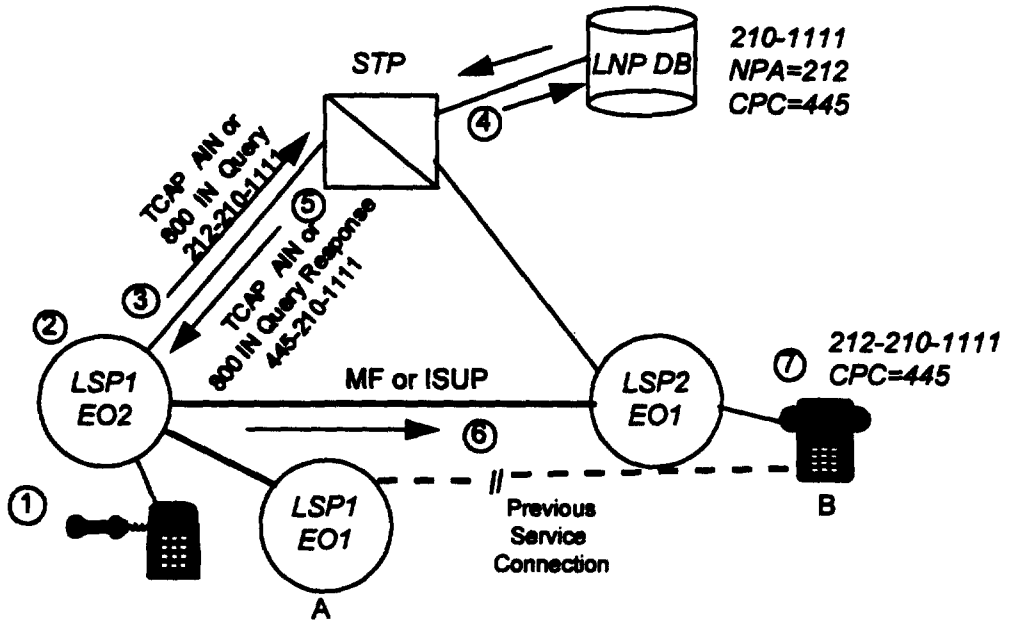
The following paragraphs provide a technical overview of our proposal.

MCImetro's Local Number Portability model is an IN/AIN-based solution that uses a Local Number Portability database (SCP) to obtain the routing information necessary to terminate calls to subscribers who have changed Local Service Providers. Each Local Service Provider will be assigned a unique three digit Carrier Portability Code (CPC) in each of the Manhattan and Rochester NPAs in which the trial is conducted. This CPC is stored with the Directory Number of the subscriber in the LNP database, and replaces the NPA for call routing purposes.

As Figure 3.6-1 illustrates, when a call is originated to a ported subscriber, the originating end office (or an LNP-capable end office) will launch a TCAP 800 IN or AIN 0.1 query to the database to retrieve the subscriber's CPC. The LNP SCP responds with the CPC + the last seven digits of the Directory Number of the ported subscriber. The call will then be routed using existing six-digit translations based on the CPC and the dialed office code

(CPC + NXX). The Carrier Portability Code is used only to route the call and is completely transparent to the subscriber.

Naturally, this means that each LNP-aware or tandem (LNP-aware or not)switch in the portability area must be able to route on CPCs just as it currently does on NPAs.



Subscriber B, located in a portable NPA-NXX, changes from LSP1 to LSP2 without changing DN (212) 210-1111. The new routing flow for subscriber B is as follows:

① Subscriber A calls Subscriber B using 210-2111

② LSP1 EO2 checks its internal Database for presence of Subscriber B. If the DN is not found, a check for ported DN is required.

③ Call is retranslated; TCAP processing prefixes 212 NPA & launches query with 212-210-1111

④ SCP searches its database for 212-210-1111, finds entry with CPC of 445

⑤ SCP sends query response to LSP1 EO2 with 445-210-1111

⑥ LSP1 EO2 translates the call using the new digits (445-210-1111) and routes the call to LSP2 EO1

⑦ LSP2 EO1 completes the call to Subscriber B

LEGEND

AIN	Advanced Intelligent Network
DB	Database
DN	Directory Number
EO	End Office
CPC	Carrier Portability Code
IN	Intelligent Network
ISUP	ISDN User Part
LNP	Local Number Portability
LSP	Local Service Provider
MF	Multi-Frequency
NPA	Numbering Plan Area
STP	Signal Transfer Point
TCAP	Transaction Capabilities Application Part

Figure 3.6-1. Call Flow for a Subscriber Who Has Changed Local Service Providers

During the trial, the LNP database will contain the Carrier Portability Code (CPC) for each ported subscriber within the portable NXXs (935, 318, 210, & 922 in New York Telephone's offices, and 987, 262, & 325 in Rochester Telephone's offices). In addition, the LNP database will maintain the master list of vacant numbers (numbers not currently

assigned to subscribers). In a non-portable environment, vacant numbers, or numbers that have not been assigned, are normally maintained by the end office that owns the NXX.

As local number portability is deployed, this method is no longer viable as no individual office will actually own a portable NXX. Vacant number processing will then be handled by the SCP based on the protocol shown in either Figure 3.6-2 or Figure 3.6-3. We minimize the size of the LNP database by not including non-ported numbers (numbers still being served by the incumbent Local Service Provider). When a non-ported number is received in an LNP query, the SCP will simply respond by sending back the default CPC for the NPA-NXX (CPC-NXX-XXXX), and the querying end office will route the call to the current Local Service Provider using existing six digit routing functionality. (Paragraph 3.7.4 contains further explanation of the SCP logic).

Our approach maximizes the use of existing protocols, using either the TCAP 800 IN (TR-TSY-000533) or AIN 0.1 (TR-NWT-001284 and TR-NWT-001285) protocols to query the SCP for a translation of the dialed number (NPA-NXX-XXXX) to the routing number (CPC-NXX-XXXX). This reliance on two alternative existing technologies offers unparalleled implementation flexibility and enhances the robustness of our solution. Furthermore, we require no changes to the TCAP 800 IN or AIN 0.1 protocols to query the SCP, and only minimal changes to call processing software that triggers the TCAP 800 queries. (The software changes that are required are detailed in our response to Paragraph 3.7.2.1.2.) Paragraph 3.8.1.1 contains a detailed description of the message flow for each triggering method.

Using our model, an LNP database query will only be required when the dialed Intra-LATA number is not in the originating end office's database, and the NPA-NXX is marked in the originating end office's routing translations as being "portable". By minimizing the number of LNP database queries, we obtain significant cost and performance advantages. We do not require an LNP database query by the originating Local Service Provider using either the Intelligent Network (TR-TSY-000533) or the AIN 0.1 implementation approach for any of the following calls.

- Local terminating calls to numbers that are populated in the switch database
- Any Inter-LATA call type (routed to the carrier)
- Calls from LNP capable switches
- Calls to unpopulated Centrex intercom numbers
- Calls to NPA-NXXs where portability is not allowed
- Calls where the dialed number is SAC code or other special number

The Carrier Portability Code (CPC) can be any three digits between 200-999, with the exception of SAC, N11, and valid or reserved NPA codes. The CPC need only be unique within the LATA because it is never delivered to an inter-exchange carrier by the originating Local Service Provider.

Since the CPC is in the same format as the NPA, it can be accommodated by either MF or SS7 signaling protocols. This feature of the design offers significant cost advantages in that existing direct MF routes between non-SS7 capable and SS7-equipped offices can be maintained, and MF overflow trunk groups between end offices can continue to be used. Calls incoming from non-LNP capable switches are handled by utilizing existing local tandem end office functionality, which treats the call as a local origination.

Figures 3.6-2, 3.6-3, and 3.6-4 illustrate the call processing logic for originating calls using IN and AIN triggers, and for incoming calls, respectively. Numbers in parentheses in the following paragraphs correspond to the circled numbers in the figures under discussion.

Figure 3.6-2 illustrates the flow for an originating call using an IN Trigger. When a subscriber makes a call (1), the following events occur:

- the serving end office first determines whether the call is an Inter-LATA call made via 1+ or 10XXX dialing, or a call requiring Operator Services (2).
- if it is either of the above, the call is routed to the appropriate carrier or operator services switch, using current methods (3).
- if the call is neither an Inter-LATA nor an Operator Services call, the end office determines whether the dialed destination is within a portable NXX by checking its own internal database using the digit translation functions of the switch (4).
- if the dialed number is not within an NXX that is marked as portable, the call is routed normally (5).
- if the dialed number is within a portable NXX, another database check determines whether the NXX is served locally (6).
- if the NXX is local (i.e., the office serves subscribers in that NXX), the office attempts to translate the number to a subscriber (7).
- if the subscriber is served by the local office, the call is an intraswitch call and is routed normally (8).
- if the local office does not provide service for the dialed directory number, the end office prefixes the NPA (if only 7 digits were dialed) and launches a

TCAP query (with NPA+NXX-XXXX) to the LNP database to determine how to route the call (9).

- the SCP checks the Ported Number database for an entry of the dialed number (10).

- if an entry is found, and the number has a corresponding CPC (11), a TCAP response containing the CPC (CPC-NXX-XXXX) is sent back to the querying office (12).

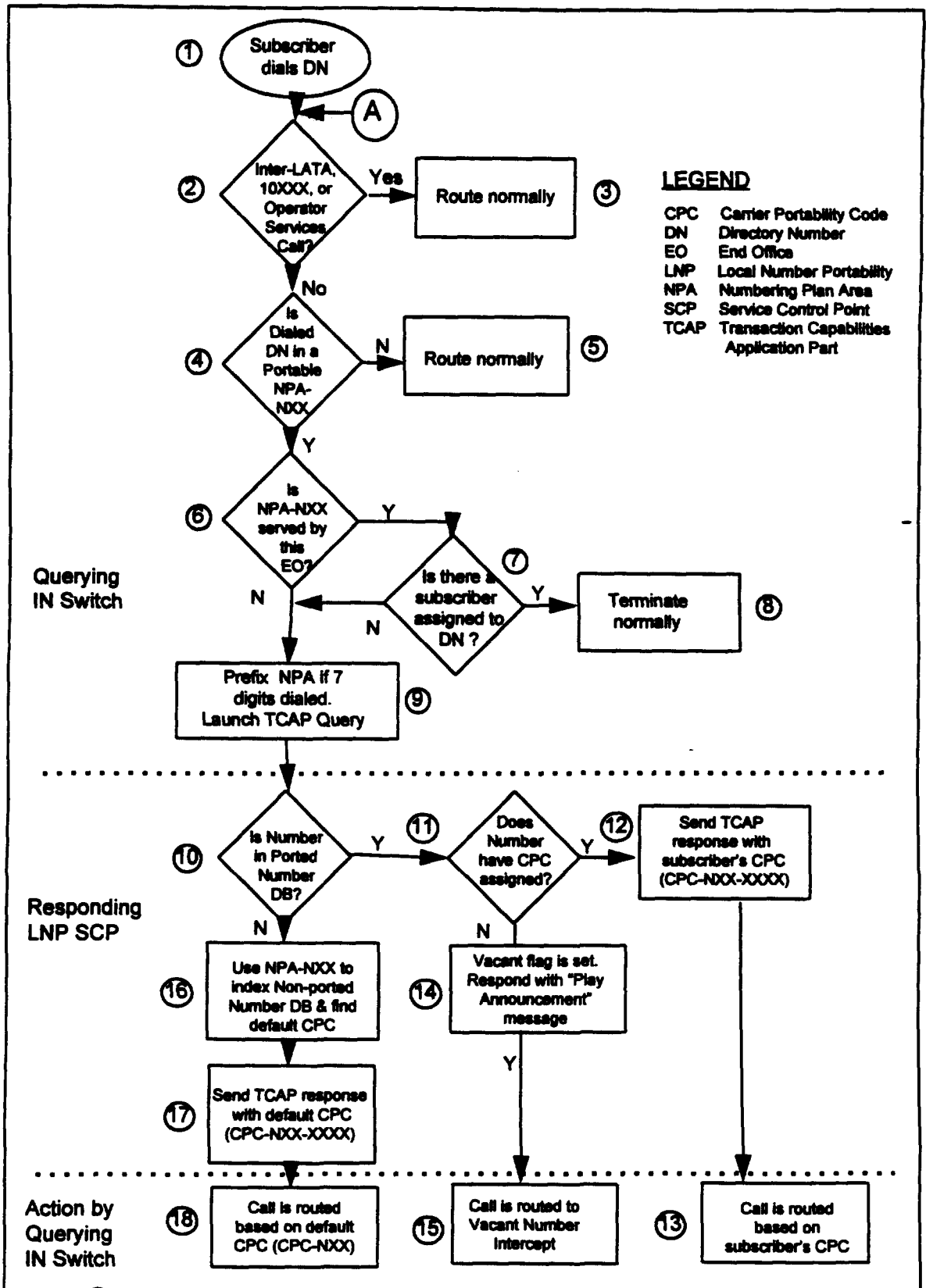
- the end office then routes the call based on the routing number (CPC-NXX-XXXX) in the TCAP response (13).

- if an entry for the number exists, but the vacant flag is set, the number is vacant, and the SCP responds with the *Play Announcement* message (14).

- the end office then routes the call to vacant number intercept (15).

- if the number was not found in the Ported Number database, the SCP uses the NPA-NXX of the number to index into the Non-Ported Number database to retrieve the default CPC (the current Local Service Provider's CPC) (16).

- the SCP then sends the routing number (CPC-NXX-XXXX) to the querying office in a TCAP response (17), and the call is routed by the end office based on the returned routing number (18).



Note: (A) Depicts flow continuation from corresponding symbol in Figure 3.6-4.

Figure 3.6-2. Flow for an Originating Call Using IN Trigger

Figure 3.6-3 depicts the flow for an originating call from a switch using the AIN 0.1 protocol. When a subscriber makes a call (1), the following sequence of events occurs:

- the serving end office compares the dialed digits to the ten digit Public Office Dialing Plan (PODP) Directory Number (DN) list (2). If the dialed number is found, the end office sends an AIN 0.1 *InfoAnalyzed* message to the LNP database (5).

- if an entry is not found in the ten digit PODP DN list, the serving office then compares the NPA-NXX to the six digit PODP DN list (3). If an entry is found, the end office launches an AIN 0.1 *InfoAnalyzed* query to the LNP database (5).

- if an entry is not found, the number is not within a portable NXX, and the call is routed normally (4).

- upon receipt of the *InfoAnalyzed* message, the SCP determines whether the call was made via 0+ or 10XXX+ dialing. If so, the SCP sends a *Continue* message to the querying office with the dialed digits unchanged (7), and the call is routed to the Operator Services switch or the appropriate carrier (8).

- if 0+ or 10XXX+ was not dialed, the SCP checks the Ported Number database for an entry of the dialed number (9). If an entry is found, and the number has a corresponding CPC (10), an *AnalyzeRoute* message containing the CPC (CPC-NXX-XXXX) is sent back to the querying office (11).

- the end office then routes the call based on the routing number in the *AnalyzeRoute* message (CPC-NXX-XXXX) (12).

- if an entry in the Ported Number database exists, but the vacant flag is set, the number is vacant and the SCP responds with the *SendToResource* message (13).

- The end office then routes the call to vacant number intercept (14).

- if the number was not found in the Ported Number database (9), the SCP uses the NPA-NXX of the number to index into the Non-Ported Number database to retrieve the default CPC (the current service provider's CPC) (15).

- the SCP then sends the routing number (CPC-NXX-XXXX) to the querying office in an *AnalyzeRoute* message (16), and the call is routed by the end office based on the returned routing number (17).

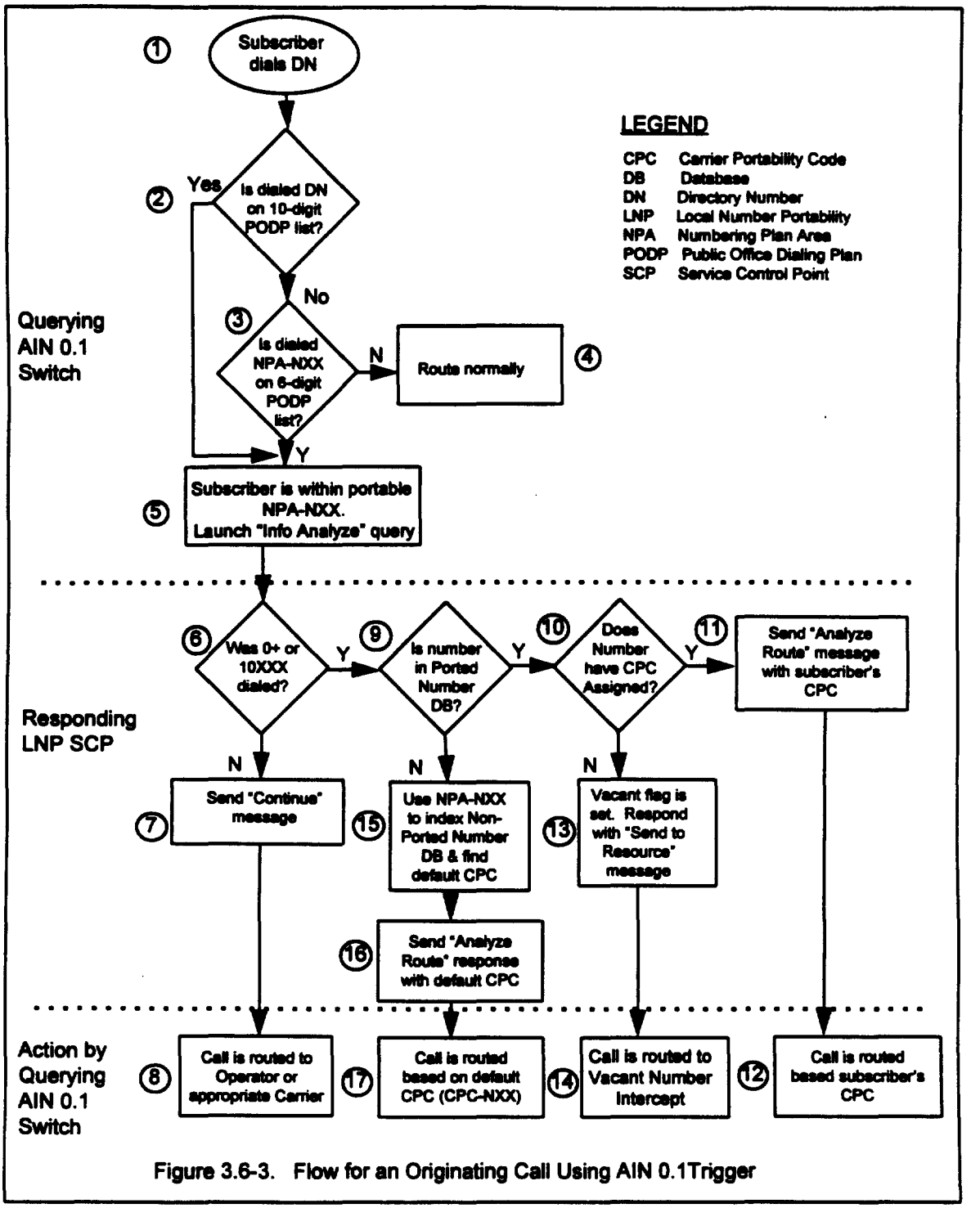


Figure 3.6-3. Flow for an Originating Call Using AIN 0.1Trigger

Figure 3.6.-4 depicts an incoming call using the TCAP 800 IN trigger. Routing proceeds as follows:

- When a call is received on a trunk (1), the end office uses existing local tandem functionality (trunk group class of service) to determine whether the call is from an LNP-capable end office or a non-LNP capable end office (2)

- A call received on a "non-LNP capable" trunk group is treated as a local origination (3), and follows the sequence shown in Figure 3.6-2.

- If the call is received on an "LNP-capable" trunk group, then the switch presumes that the LNP database query has already been performed (4).

- If the call terminates to a local NXX (5), and 10 digits were delivered (e.g., the end office serves more than one NPA), the CPC is replaced by the NPA and the call is terminated to the local subscriber (6). The CPC must be replaced by the NPA to ensure features such as Calling Number Delivery continue to operate properly, but only when 10 digits are delivered (e.g., the end office serves more than one NPA).

- If the NXX is not served by the end office, no substitution takes place, and the call is routed to the proper Local Service Provider using the CPC-NXX-XXXX and normal local tandem functionality (7).

Few variations occur if the incoming trunk call uses an AIN 0.1 rather than an IN trigger. If an LNP query has already been performed for the call, the number will be delivered as CPC-NXX-XXXX. Because CPC values are not entered into the PODP list, the call routes normally. If the call has not yet been translated, the PODP trigger is hit, and a query is sent to the SCP via an AIN 0.1 *InfoAnalyze* message. From this point, the routing is identical to that shown in Figure 3.6-2.

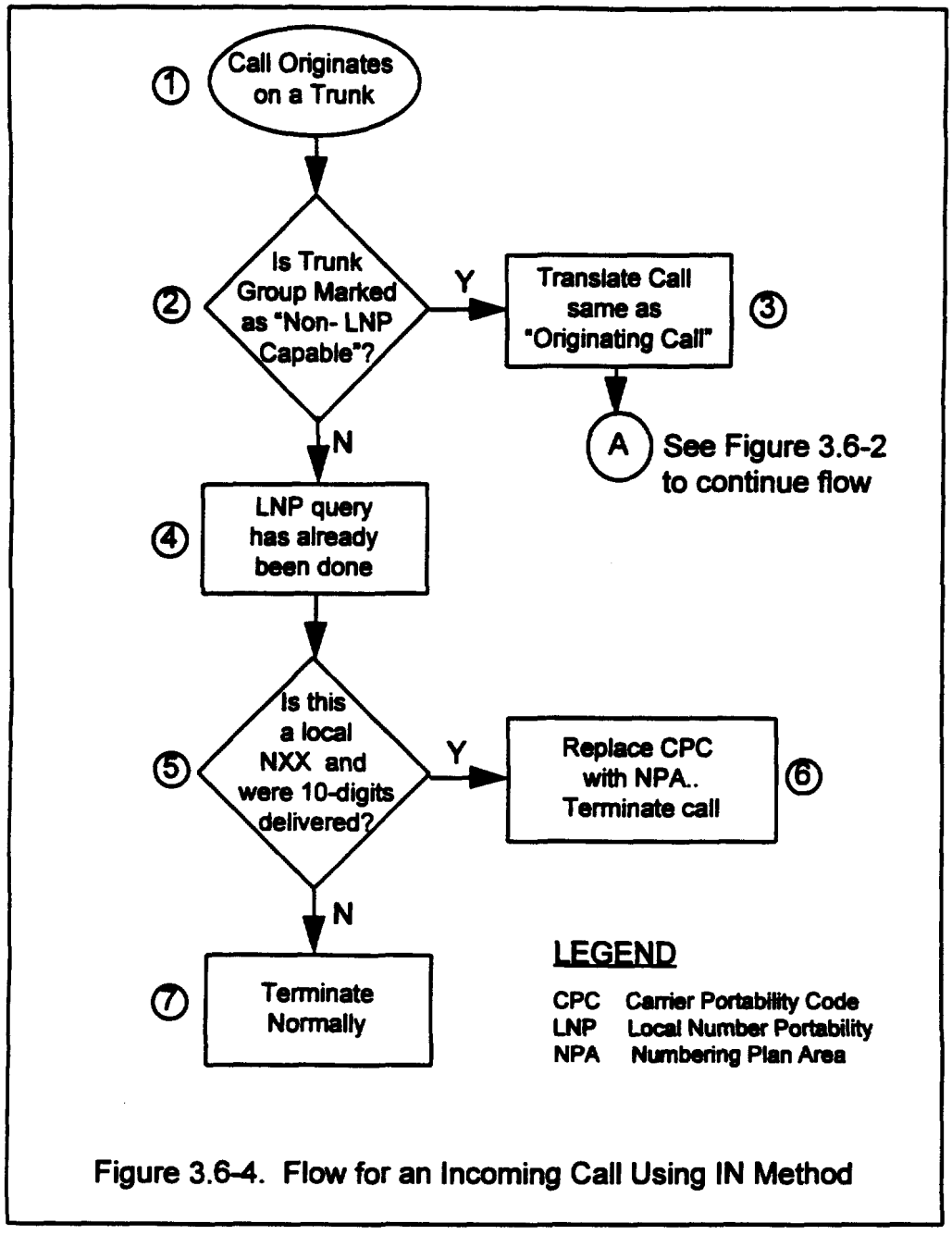


Figure 3.6-4. Flow for an Incoming Call Using IN Method

For service provider portability, the SCP must always return to the querying switch the NXX-XXXX digits delivered in the LNP database query. The SCP affects only the NPA, changing it to a CPC. Non-ported numbers need not be stored in the LNP database. If the SCP cannot locate a 10-digit number in the Ported Number database, it will search the Non-Ported Number database for the default CPC using the received NPA-NXX as an index. This CPC will identify the current Local Service Provider serving the subscriber.

With respect to trigger location (i.e., which switch involved in a call issues the query), MCImetro's model follows the industry-accepted, N-1 local number portability network hierarchy. Under this hierarchy, participating interexchange carriers are responsible for

querying the LNP database for InterLATA calls and for delivering them to the proper Local Service Provider. Participating carriers with TCAP capabilities can query the LNP database using either the IN (TR-TSY-000533) or AIN 0.1 (TR-NWT-001284 and RE-NWT-001285) protocols. Companies that do not have these industry-standard protocols deployed in their switches will need to make provisions to obtain their own copy of the LNP database, although we will assist these companies in this effort.

In an LNP environment, the NPA-NXX no longer defines the address (physical location) of a subscriber. To accommodate TCAP queries between switches for CLASS features (e.g., Automatic Recall/Automatic Callback), STPs will be required to perform 10-digit Global Title Translation (GTT) for the NPA-NXXs opened for portability to new Local Service Providers. While we can accommodate this requirement for the trial, we recognize that this important issue must be addressed for commercial deployment. We believe that this issue should be jointly resolved by the participating Companies during pre-trial and trial activities. We would be pleased to coordinate actions toward this end.

Our LNP solution does not affect features that use the Calling Party Number and redirecting number. For calls that involve features that use a previously stored called-party number (e.g., Call Forwarding, Speed Calling), an LNP database query is necessary to ensure that the current Local Service Provider is used to route the call. Since the query is launched prior to routing the call, a query is not necessary when these features are activated. To ensure that these features work properly on the terminating side, the terminating office must change the CPC back to the corresponding NPA prior to handling the call. However, this is only required for those exceptional cases where 10 digits are delivered to the terminating office (i.e., when the switch serves subscribers in more than one NPA).

We are committed to providing not only a very robust technical design, but also the support necessary to ensure a successful LNP trial. The resources required to manage the project will be available from the pre-trial stage through the trial-exit stage and beyond. As evidence of our commitment to this trial, we have scheduled the following non-required actions:

- Installation, testing, and commissioning milestone documentation (APPENDIX D, items 23, 26 & 39)
- Hosting a pre-trial inaugural meeting in New York to cover all aspects of our ongoing LNP work and our plan for successful trial completion (APPENDIX D, item 15)
- Providing technical support for switch-vendor implementation (APPENDIX D, item 29)

- Preparing a comprehensive implementation guide covering all aspects of the model (APPENDIX D, item 23)

- Providing access to existing model test plans and results

- Analyzing the engineering impacts on the network due to a large scale deployment (APPENDIX D, item 46.3)

- Providing all participating Companies with access to all data and reports collected during the trial (APPENDIX D, items 43, 53 & 62)

3.6.1. The proposed trial architecture should take advantage of the rapid deployment of Signaling System No. 7 (SS7) and intelligent networking solutions in the LEC and IXC switched networks. While it is understood that varying forms of service provider LNP architecture may exist, this technical trial shall require the Provider to propose an SS7-based solution using a network database, e.g., a LEC Service Control Point (SCP) or IXC equivalent.

Our solution fully complies with the requirement of being based on the use of SS7 and an intelligent network; moreover, it provides maximum flexibility by allowing participating carriers the option of implementing the model via either an IN or AIN 0.1 architecture. Additionally, this model minimizes the impact to existing networks by allowing the continued use of MF trunk groups (either as primary or alternate routes), since the 3-digit Carrier Portability Code can be accommodated by the MF signaling protocol. Should we be chosen to provide the products and services for this trial, we will provide all participating Companies with full assistance in planning, implementing, and testing the LNP network.

3.6.2. Nominally, the trial LNP database shall be queried, when necessary, by the originating local service provider for local calls or Intra-LATA toll calls for which the originating local service provider is the transport carrier. For Inter-LATA toll calls and Intra-LATA toll calls handled by a trial participating IXC, the IXC shall dip the database. Other participating carriers, for example cellular services providers, should be permitted to query the LNP trial database using their own switching offices, or route local calls thorough another network to perform the query. Each participating terminating local service provider must also be able to query the database as a necessary fail-safe mechanism when it receives calls from non-participating carriers.

Our LNP solution provides the means to query the LNP database for both Intra-LATA local and Intra-LATA toll calls using either the IN or AIN 0.1 protocols. Calls made to Inter-LATA destinations are immediately routed to the appropriate inter-exchange carrier where the LNP database query will be performed. Using our model, each carrier, whether participating Local Service Provider, non-participating Local Service Provider, participating cellular provider, or non-participating cellular provider, is free to choose to

access the LNP database directly or to make the necessary arrangements to hand off the call to another carrier for processing. Participating terminating Local Service Providers may also query the database as a fail-safe mechanism. This capability is detailed in Paragraph 3.7.5.4.

3.6.3. Participating carriers (local, interexchange, or other) will query the database with a 10-digit NANP number and the database shall respond with information that accommodates the various carriers' existing routing arrangements to terminate the call to called party's line on his or her local service provider's network. The response must include information that allows the querying switch to identify the called party's serving end office.

Because our solution, the Carrier Portability Code (CPC) model, was developed specifically to operate within the existing network, we comply fully with the requirements of this paragraph.

When a call is originated to a ported subscriber, either the originating end office or an LNP-capable end office launches a TCAP 800 IN or AIN 0.1 query to the database to retrieve the subscriber's Carrier Portability Code (CPC). The SCP will respond with a 10-digit routing number that contains the CPC + the 7 digit Directory Number of the ported subscriber. The call is routed based on six-digit translation of the CPC and the dialed office code (CPC + NXX).

Our solution fully meets the RFP requirements by delivering the routing number (CPC-NXX-XXXX) in a 10-digit North America Numbering Plan format and allowing calls to be routed via existing network routing arrangements (both MF and SS7 trunks). Furthermore, the Carrier Portability Code, which is returned by the SCP, is the information used by the querying switch to identify the called party's serving end office.

3.6.4. Although a single database will be employed for trial purposes, this does not preclude future industry-wide agreement and evolution toward the deployment of multiple carrier databases fed by a common Service Management System (SMS). It is also recognized that, in the future, the implementation of intra-carrier LNP databases, along with the intra-carrier system interfaces, may vary from carrier to carrier.

Our LNP model fully supports the deployment of multiple carrier databases fed by a common Service Management System. We concur with this view on the direction of the industry, and have already begun investigation into the Service Management System functions that will be required to provide subscribers with the highest level of service in an LNP environment.

We are confident that our ongoing Local Number Portability activities, as well as our planned pre-trial and trial activities, will support a smooth transition to wide scale implementation that incorporates multiple databases fed by a common SMS.

3.7 Trial Requirements

[No RFP Paragraph provided]

We believe that we can best satisfy both the technical and managerial requirements of this RFP by using the Carrier Portability Code (CPC) approach that proved successful in our prototype work. Table 3.7-1 lists important characteristics of our solution and the benefits they provide.

Table 3.7-1 Highlights and Benefits of MCI's LNP Trial Approach

Trial Approach	Benefits
Pre-trial planning activities are based on a working IN/AIN solution.	• Increases probability of successful trial by reducing technical and schedule risks. • Allows interested parties to choose between an IN or AIN interface and begin early planning.
Participating Companies will be fully involved throughout pre-trial, trial, and post-trial activities.	• Ensures a more rigorous trial. • Strengthens post-trial report. • Identifies and resolves issues earlier. • Facilitates early, broad-scale LNP implementation.
Project managers will use the full-cycle approach detailed in APPENDIX D during the pre-trial, trial, and post-trial phases.	• Increases probability of trial success. • Increases the likelihood of a smooth transition to broad-scale implementation.
Trial will satisfy dual criteria: (1) a research rigor in modeling and simulation of broad-scale capability (2) operations realism with respect to quality of subscriber service, protection of billing data, etc.	• Ensures a more rigorous trial. • Produces greater credibility under post-trial technical and political scrutiny. • Demonstrates proof of minimal impact upon subscribers, LECs, IXCs, etc. • Enables earlier acceptance for broad-scale implementation.
Incremental program uses existing TCAP 800 IN and AIN 0.1 protocols and triggers implemented in the field today.	• Allows LNP deployment in pockets, or as portability "islands," without requiring extensive architecture/software changes to the existing switches in those areas. • Provides a smooth transition to wide-scale LNP deployment. • Requires minimal software changes. • Uses existing central office routing. • Operates with MF or SS7 trunks. • Supports normal operation of widely deployed subscriber features. • Supports non-LNP-capable offices.